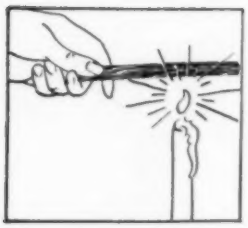
PLASTICS

A Periodical Devoted to the Manufacture and Use of Composition Products

OCTOBER, 1926

Will any other raw material stand these 4 VITAL TESTS?



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3 *Non-Conductor of Heat and Electricity*

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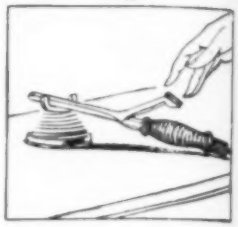

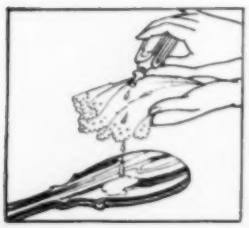

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4 *Machines Perfectly*

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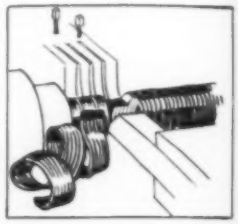

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WITH the present number, Plastics enters upon the second year of its existence. The first number to make its appearance was the October issue of last year.

We have very much to be thankful for when looking back upon the past twelve months. Quite naturally we were rather anxious to know how our efforts to provide so diversified an industry as is encompassed by the name "plastics" with an informative trade paper would be received.

It did not take long to get the answer. Not only did the subscriptions come pouring in, but what is much more encouraging to a trade journal, the producers of the materials and machinery in the industry were just as quick to avail themselves of its advertising possibilities. The growth of this part of the paper has several times necessitated an enlargement.

For 1927 we have in contemplation a still larger and more comprehensive journal: both page size and number of pages will be increased. In order to make it possible to bind the first 15 numbers in one volume we are retaining the present size until after December. Also as announced in the September number, a Directory and Buyers' Guide will be issued at the end of the year.

This will cover a most complete and carefully checked list of both producers, manufacturers, fabricators and users of everything that enters into the Plastics industry.

A comprehensive index of the entire text portions of this magazine, both as to names and subject matter will be included.

Our sincere thanks is extended to all of our subscribers and advertisers who have supported us, and we promise to continue to merit their approval.

The Publishers.

PLASTICS

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 2 October, 1926 No. 10

Contents

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PLASTICS

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 2 OCTOBER, 1926 No. 10

Photography With Synthetic Resins

Radically new line of development opened up by discovery of light-sensitive condensation products

A NEW field for the utilization of the synthetic resins, is opened up by a process developed by Murray C. Beebe, Alexander Murray and Harold V. Herlinger of Cincinnati, O.

Photographic methods, ever since Daguerres' first discovery, have been limited practically to the light-sensitive silver salts. It may be recalled that another product useful in the Plastic field played an highly important role in the development of photography, — namely, collodion, which is a solution of cellulose nitrate.

With the exception of the slow working ferrocyanide or blue print processes, and analogous methods, no startlingly new discoveries were made. Now, however, it appears as though the synthetic resins, even those of the phenol type, and especially such as are made from furfural show promise of utility in photography.

It is difficult at this stage of what promises to be a new industrial art to fully appreciate all the latent possibilities presented by the products descibed by the inventors of a new process of photography.

Without a doubt, however, we shall hear more on this subject before long.

Its application directly to Plastics in general is but a step away. As a recent publicist has aptly said, "Keep your eye on furfural."

Effect of Light on Resins

That the resins were light-sensitive has been known for a long time, and processes depending upon the insolubilization of bitumens have been actually used. Another method involving the insolubilization of sensitive media by light is found in the gelatin and gum processes, such as the gum-bichromate process. The use of synthetic resins, however, is new, and the process is thoroughly covered by the thirty-seven claims of the patent.

It is almost self-evident, that no one is better able to describe a new invention than the patentees, so, in order to give a fairly comprehensive description of the process, we quote from the patents.

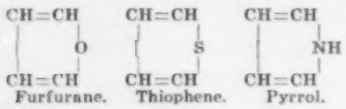
For example, U. S. P. 1587269 says:

"In the practice of the invention, we utilize a class of chemical compounds for photographic purposes which hitherto has not been considered available for such purposes; a class which affords a simple medium which can be readily applied as a coating to metallic surfaces, or other surfaces, or which may be employed in any other surfaces, or which may be employed in any other suitable manner; a class of materials which is sensitive to the action of light to a greater or less degree, without the addition of accelerators, or sensitizers, but with which suitable sensitizers may be incorporated; a class of materials which produces a print which is readily developable with simple solvents; which affords a medium which forms an unusually good resist against the action of etching agents when the developed print is on a surface that is to be subsequently etched, for printing or other purposes; and which affords a medium depending upon its production on inexpensive materials, such as furfural, acetone, etc., whose source of supply is practically unlimited.

Compounds Used

The principal ingredients which we use have not been classed hitherto with photographic materials. The class of compounds which has been found by us to possess remarkable adaptability to the preparation of light-sensitive media includes that group of materials

containing five membered monoheterocyclic compounds, comprising the furfurane-pyrrol-thiophene group, derived from the following parent compounds. Typical examples of these compounds are here given:



It may be stated that resins, or resin-like materials, may be produced from compounds of the character referred to by known methods, or by any approved method. For example, a resin may be produced by condensing furfural through the use of various reagents, such as aniline, hydrochloric acid, ammonia, acetone, methyl ethyl ketone, alpha-naphthylamine, sodium hydroxide, etc. While the production of resins of this general character is known and described in the literature, it has not been known hitherto that such synthetic resins can be employed advantageously in the photographic arts. The resins, or resin-like materials, produced from the compounds referred to above appear to be condensations, or polymerizations.

Forming Images

Our invention, in one aspect, lies in the application of one or more of these five-membered ring, heterocyclic compounds referred to above, or derivatives of the same, to photographic purposes. When, for example, such materials are applied as a film to a metallic surface, a glass surface, or other desired surface, as by flowing, spreading, or otherwise, preferably in the form of a solution of the resin having a consistency of a lacquer, or thin solution, they are so sensitive to light as to enable them to be readily utilized for photographic purposes. Photographic images may be formed readily in such media, and may be developed through the use of suitable solvents, selective dyeing, or the like.

The exact chemical reactions which bring about these radically new results are not fully known, but may, by reasonable hypothesis, be attributed to what we may designate as photocondensation, photooxidation, photoesnification, or polymerization. As heretofore stated, a furfural resin coating is in itself light sensitive to a remarkable degree without the addition of accelerators or sensitizers; yet, under certain conditions, the inclusion of sensitizers does produce acceleration.

Applications

There are many practical applications of our process, such as decorating metallic or other surfaces through the inclusion of a desired color with the coating, preparation of ligthographic plates, half-tone process plates, intaglio printing plates, etc. Screenless photo litho-plates may be produced from continuous-tone negatives because the coating becomes variably permeable to etching reagents in an inverse ratio to the light intensity of the luminous rays to which the coating has been exposed.

We have found that pyrrol and thiophene condensation products similarly produced have shown light sensitivity. These, as already stated, are alternative compounds in our process.

As examples in the practical applications of our process, we may instance the following.

(a) Furfuramide resin:

A mixture of 100 grams of furfural and 100 grams of concentrated ammonium hydroxide is introduced into a flask at room temperature. Condensation may be effected under gentle heating, if necessary. The resinous product is dried, after being separated from the entrained water, by heating to 105 degrees C. for an hour, and, when dissolved in benzene or acetone, is applied as a thin film onto the surface upon which the photographic print is to be made. Printing may be done by contast or by optical projection as desired, the time varying from one to five minutes, depending on the density of the negative, etc. After printing the image may be developed in a 25% solution of benzol (benzene) in turpentine which gives good results. The sensitivity can be increased by adding a halogen source, such as small percentages of iodoform, methyl iodide, iodine, or ammonium bichromate, so that contact prints are produced under an arc light in two and one-half minutes, instead of five, without the inclusion of a sensitizer.

Among the most sensitive substances which we have found are the furfural-ketone resins of which the following is a practical example:

(b) Furfuracetone resin:

A condensation product is produced by applying heat at about 100 degrees C . to 90 grams of furfural in 58 grams of acetone combined with 100 grams of concentrated solution of sodium hydroxide, as a condensing agent, in a reflex condenser for half an hour. The resulting product is somewhat viscous, and may be directly diluted by a suitable thinner, such as benzol, or acetone, to form a sensitive film of any desired consistency. Acetone is here given as an example of a ketone.

Print in Seconds

The condensation product may be purified and recovered by neutralizing the sodium hydroxide with acid, or acid solution, decanting, and drying the precipitate at 105 degrees C. Prints are made in the remarkably short time of ten seconds by contact printing under an arc light. Sensitizers, such as iodoform, colloidal iodine, etc., may be added if desired.

As an exemplification of photo condensation, in which furfural is used, we have found the following of practical value:

(c) Direct photo condensation:

60 grams of furfural and 40 grams of aniline are mixed, and the mixture applied directly as a thin film to a suitable surface; or, the materials are incorporated in a suitable medium, such as cellulose acetate, asphaltum, cumar resin, etc., which may in themselves be sensitive to light. When exposed to an arc light, such a mixture becomes resinous

(*Continued on page 360*)

Molding Seamless Hollow Objects

Ingenious method evolved by Rein and Liefke may find useful application in other fields

THE molding of plastic objects is by no means limited to the pyroxylin plastics and the various natural and synthetic resins. An industry which makes use of advanced methods of molding, and whose combined output is exceedingly large, is represented by the making of molded toys, especially dolls.

The heads and sometimes the body parts as well of those widely sold articles, are usually made of a composition such as a mixture of wood, flour, resin and glue. In most common dolls heads, which are invariably hollow, the point where the two sections of the molded head are afterwards joined together is quite noticeable. Many attempts have been made to overcome this and to produce a doll's head or for that matter, any hollow object, which would be free from this noticeable seam.

While primarily intended for molding wood flour-resin compositions into dollheads, the principles involved are applicable to other molding problems.

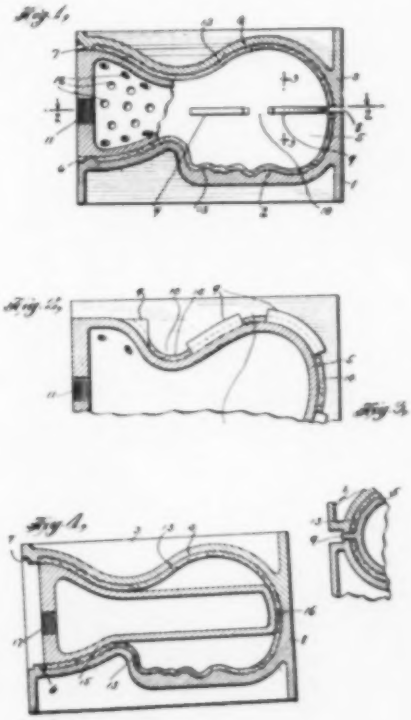
With the present demand for continually increased product so as to lower costs any advance in the art of molding is interesting to every one in the industry.

The New Way

One method of accomplishing this result has been recently patented by Alexander Rein and Rudolf Liefke, of New York, in their specification 1,584,193, granted May 11, 1926.

To properly understand the method, reference must be had to the drawings which accompany the patent, and as the method appears to have considerable merit and to be widely applicable to molding in general, we are reproducing a portion of the description. According to the inventors:

"According to the present invention, the material which is to be cast, and while it is in a soft or semi-soft, semi-plastic condition is applied to the face of the several sections,, preferably two. Pressure is then applied to the material in the mold sections to conform the material



to the outlines of the mold and to at the same time cause some of the material to be extruded at predetermined points about the periphery of the mold sections. This extruded material provides a number of offsets attached to the main body of the material. To obtain the pressure necessary to conform the material to the mold sections and to cause an extrusion of some of the material we employ a core, upon which the mold sections are superimposed. The core is of such a thickness as to prevent meeting of the edges of the mold sections and is provided with an annular flange, which lies when the mold sections are in place between the adjacent edges of the mold. This prevents the mold sections from meeting each other, and the flange is provided at intervals with cut-out portion or voids, into which the extruded material is forced by the pressure of the mold sections.

Uniting the Halves

core. The core is heated, preferably, and the parts are left in superimposed position until the material being cast is slightly hardened, but before this material has taken a permanent set the core is removed. The mold sections are then again placed in superimposed relation and at this stage of the process the mold sections are allowed to come together so as to bring the offset provided by the extrusion of the material during the first step of the process into contact with each other. In fact, the offsets are now forced into each other, and as they are still in a semi-plastic condition, they will unite to provide a single member or offset. With the parts in this position the heat is again applied and this time the material is heated until it has hardened. This method provides a doll's head, for example, which may be said to be in one piece instead of in two pieces, as provided by the methods now in commercial use, and such a head may be dropped without splitting, the several original sections of the casting being joined and held united by the offsets

provided by the extrusion of the material.

"In the casting of dolls' heads it is desirable also at the same time to cast the neck and shoulder portions of the doll. In the second step of the method, that is to say, after the original core has been removed, a second core is employed, which, however,, is not like the first core in that the head portion, that is to say, the portion which conforms the material to the inside of the molds, is omitted, the shoulder and neck portions, however, being retained. This enables the interior of the mold to be heated thoroughly in the last step of hardening the material being cast.

"Fig. 1 is a sectional elevational view of our improved mold showing the first step of our improved method;

"Fig. 2 is a section on the line 2—2 of Fig. 1 looking in the direction of the arrows, this view showing the material which is extruded from the molds in the voids between the flanges or fins on the mold core;

"Fig. 3 is a section on Fig. 1 taken on the line 3—3 in the direction of the arrows thereon;

"Fig. 4 is sectional elevational view similar to Fig. 1 showing the second core in place and the doll's head in the last stages of its manufacture;

More Details

"Referring to the drawings in detail, and first of all to Figs. 1 to 4 inclusive, 1 designates one section of a mold adapted for use in the practice of the invention, the mold section of this figure being adapted for use in the casting of a doll's head. This mold section is concave, as indicated, the concave face, designated 2, being shaped to form the face as well as the neck and shoulder portion of a doll. 3 designates another mold section, also concave, to provide a concave face 4 adapted to provide the back of the head, neck and shoulders of a doll. 5 designates a core upon which the mold sections 1 and 3 are adapted to be superimposed, the core 5, as shown in Fig. 2, being provided with faces to correspond to the conformation of the concave faces of the mold sections 1 and 3. The mold sections 1 and 3 are provided with offsets 6 and 7, adapted to engage the base of the core 5, the core being of such a thickness that when the same is interposed between the mold sections 1 and 3 the mold sections are maintained spaced from each other, as indicated at 8. The core is provided with laterally extending fins 9, these fins when the mold sections are in superimposed position filling the space between the mold sections except at the voids 10, these voids being cut-out portions of the flanges 9, the purpose of which will be pointed out hereinafter. The core 5 is provided with an opening 11 for the attachment of a gas tube or other heating device, whereby the core may be heated during the casting operation, the air necessary for supporting combustion, within the core being admitted through air inlet openings 12.

In the casting of a doll's head, for instance, in the mold above described the material which is to be cast, designated 13, and which may be, for example, a mixture of wood, flour, resin and glue, is applied to the concave faces of the mold sections 1 and 3 and pressed into the mold sections to take the shape thereof. The initial application of the material being cast may be performed by hand, for instance. The mold sections are then su-

(*Continued on page 364*)

New Pyralin Show Rooms

PERFECT arrangement and harmony are the outstanding characteristics of this interior exhibit of the Du Pont Pyralin showrooms.

Every set is placed so as to be immediately accessible for inspection. Individual articles comprising the toilet wear sets are displayed in the showcases against backgrounds of black velvet.

The display shows seen in the rear of the photo hold row after row of the sets. Various designs and colors are grouped in separate sections, every set being arranged so that the buyer may inspect and examine it at his leisure. This attractive exhibit is located on Fifth Avenue at 33d St., New York City.

Ideas! Ideas!

Suggestions contributed by contestants in the recent prize contest

SUGGESTIONS and ideas contributed for possible prizes in our recent contest had been collecting for some time before the final date, Aug. 25, and it was only after wading through quite a lot of material that we were able to arrive at any decision.

As we said in our last issue (September), no one merited the first and second prizes, as not one of the ideas submitted actually fulfilled the requirements. What we wanted, and still are looking for, is a really NEW use for the various plastic materials used in industry—specifically the phenol resins, the pyroxylin plastics, shellac and similar resin plastics and casein and blood solid compositions.

As we already mentioned in an earlier issue, not many of the contributors of ideas took the least trouble to find out if their suggestions had any novelty at all. From general appearances it seems as though they just jotted down the first thing that came into their heads. Some of them did not even take the trouble to specify just what kind of Plastic was to be used—which of course put them right out of the running.

Now for some of the suggestions.

"Could be used for crutches," says someone. That's old. To use the phenol resins in place of tile in fireplaces was a suggestion that seemed new but it lacked the essential of possibility. No resin will withstand such temperatures.

The use of transparent cellulose products for wrapping books etc., was another suggestion. Cellophane has been used for years for this purpose. Quite a number of suggestions as to necktie holders were received. These were in vogue thirty years ago. Another brilliant collaborator suggested making toys out of "celluloid." If any of our readers have never seen any celluloid toys let them rise up and say so.

Musical instruments, to be molded from pyroxylin plastics, were contributed by several. Of course this is a very old use. Then came combs (!), boxes, picture frames, chessmen, paper weights, name plates, eyeshades, fans, shuttles for weaving, badges and ornaments, key-tags, piano keys, medallions, kaleidoscope casings, watering cans and pails for toy use, hats, monograms for automobiles, automobile tires, bookbindings, coated steel and wood objects, spoons, forks, knives, doorknobs and interior hardware trim and the like were some of the ideas.

Others came to the front with things like these: Windshields; window shades (how about Tontine?), artificial flowers (page Mr. Woolworth), musical instruments (not ONE phonograph record was ever non-plastic), transparent dishes to be used in ovens (if the Board of Fire underwriters doesn't stop you), insulation, both heat, cold and electrical; veneer for table tops, artificial fruit (we had a whole article on that subject not so long ago); radiator caps; transparent raincoats (been on the market since 1910), watch crystals, artificial leather (poor old Pegamoid—it's been forgotten long ago), substitute for corset steels and whalebone, teeth fillings, theatre curtains impregnated with phenol resins (but how would you get them up or down), radio loudspeakers (they all are molded), table mats for hot plates, bicycle parts, linoleum, tack-heads (if they didn't break off on hammering, yes), tennis rackets (they do make them that way), roofing (unless phenol gets very cheap would be too expensive), artificial teeth, shoe parts, splints and casters for furniture.

Another line followed such novel ideas as goggles, and colored screens for lighting effects, printing plates, (how about the work of Novotny in this line?), shoe heels, vanity cases, soft collar supports to keep them from wilting, poker chips and other game counters, headlight rims, clock cases, gas-range handles, toilet boxes and seats, glass holders, cups, saucers, statues, watch cases, flashlight casings and finally mirrors of intrinsically transparent plastics.

Many of our more experienced readers will smile with us at some of these ideas, submitted in all earnestness and sincerity. The reason seems to be lack of publicity. And the answer to that is too obvious to even mention.

We are still open for suggestions for a real, honest-to-goodness NEW use for these mater-

(*Continued on page 372*)

Activities of the Pyroxylin Fabricators

Registration of designs, open stock, price cutting, quality of products, and bristles cause lively discussion at recent meeting

THE regular monthly meeting of the executive committees of the Toilet Ware Division and of the Pyroxylin Fabricators' Association was held on Monday afternoon, September 13, at the Aldine Club, New York City.

The following concerns were represented:

Art Ivory Co., Inc.
The Celluloid Co.
DuPont Viscoloid Co., Inc.
The Fiberloid Corp.
S. Langsdorf & Co., Inc.
Howard Specialties Co., Inc.
Newark Tortoise Shell Novelty Co.
Plastics.
F. D. Dodge.
H. D. Clark.
L. Marder.
A. Lefferts.
A. E. Pitcher.
E. J. Levine.
L. E. Levine.
L. D. Cahn.
L. J. Horn.
E. Neugass.
Morris Marx.
William Segal.

Mr. Morris Marx, president of the Association, called the session to order at 3.15 P. M. The minutes of the previous meeting were read by the executive secretary, Mr. F. T. Dodge.

Designs

Mr. Dodge read letters received from the Newark Noveloid Company, the Optical Products Corp. and Trenkmann Brothers in which they tendered their resignations from the association. Inasmuch as the optical division has been practically defunct for sometime, those resignation were accepted immediately.

The executive Secretary presented certain problems about the registration of designs and asked for instructions on how to avoid the registration of new designs which are in conflict with those previously filed or with merchandise already on the market. During the discussion the question was asked whether a member who had brought in Pyroxylin a design which had been made in silver or any material other than pyroxyln would be entitled to enter such a design for registering at the office of the Association. It was moved, by E. J. Levine and seconded by L. Marder, that the procedure heretofore agreed to by this Association covering the registration of new designs by members be construed to cover designs of toiletware already on the market other than Pyroxylin Plastics.

This motion after debate was carried unanimously.

Registration

In order that the office of the Association may have a complete record of all designs now on the market it was moved, seconded and carried that the Executive Secretary be instructed to send the minutes of this meeting to all the members of the Association and to request them to file copies (outlines) of all designs now on sale and the following information about each design:

Design Name ..... No...
Weight of Stock .....
Year In First Manufacture ....
Special Features .....
.....

In order that the members of the Association may be fully informed as to the regulations which had been approved by the organization, the Executive Secretary was instructed to include in the minutes of this meeting the resolution on registration of designs which was adopted September 9, 1925:

"It is agreed that no member of the Pyroxyln Fabricators Association will knowingly copy any design or trade name or pattern or outline of any article, or decoration thereof of new designs of fancy cases, created by any other member of the Association.

"As a measure of protection to the creator of a design, he may file a copy or sample of the new design with the secretary of the Association, who shall make record thereof as of the date received."

Price Cutting

There followed an open discussion on price cutting in the toilet ware industry. Mr. Ed. Neugrass, of the Howard Specialties Co., was delegated as an informal committee of one to investigate certain rumors of alleged lowering of prices.

Mr. Marx then said a few words on the advisability of instituting and furthering the selling of open stock. He stressed the fact that casual purchasers might become customers buying at regular interval, adding to their sets, replacing new pieces, etc. After discussing the matter from both the manufacturers' and retailers' viewpoints, the discussion was dropped. Those present were about evenly divided as to whether the benefits to be derived were worth the trouble of increased cost of stock keeping.

Quality

During the meeting an interesting discussion arose on one of the old evils of the toilet ware

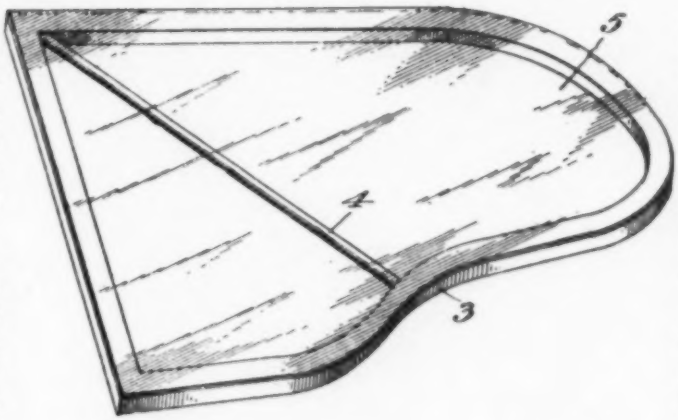
(*Continued on page 373*)

A New Use For Pyroxylin Sheets

Sounding boards for pianos may prove to be an additional outlet for cellulose nitrate products

MAKING sounding boards of pianos out of celluloid promises, if really successful, to furnish another another important outlet for the pyroxylin plastics.

Arthur Vredenburgh, of Ormond, Florida, has just obtained a patent on the idea (U.S.P. 1,582,564, Apr. 27, 1926.) He claims that sounding boards made of pyroxylin plastics give a more even and full tone and desirable resonance, but that the structure is simpler and that the process is applicable to ordinary instruments without materially altering the general combination and arrangement of the parts.



The accompanying drawing is a perspective view of a sounding board for a grand piano.

The usual open frame is designated 3 and may be of any desirable material or form, depending upon the particular instrument in which the device is to be employed. In the present embodiment this frame is illustrated as having a brace 4 extending diagonally from an intermediate portion of its curved side into the corner.

Covering the space defined by the frame is a diaphragm number 5, preferably formed of a single sheet of celluloid or corresponding plastic material that is fastened at its margins to the frame and is put under tension.

Softening the Sheet

This is accomplished by softening the celluloid sheet and making it elastic by treating with the following solution:

In each quart of wood alcohol there is dissolved one-half ounce of camphor, and to each gallon of the same there is added two ounces of sulphuric ether (i. e. ethyl ether). About four ounces or one-quarter of a pint of water is then added to each gallon, and when the celluloid sheet is treated to this composition either by dipping it therein or applying it to the surfaces, the sheet becomes rubbery and elastic, and capable of being stretched and suitably secured by its margins, in stretched condition, to the frame.

Fastening to Frame

A very satisfactory method of securing it is by a water-proof cement, consisting of four ozs. of celluloid dissolved in one gallon of amyl acetate, with approximately four ounces of ether. If this cement is applied to one face of the frame, and the sheet is stretched thereupon and attached by the cement and the whole allowed to harden, the celluloid reassumes its original condition and contracts materially, thus putting it under relatively high tension. As a consequence a sounding board is produced that is different from wood laminae and has a resonance and even tone that is peculiarly desirable for musical instruments.

This method may well be worth trying out. One advantage that is quite obvivous is that such a sounding board will be very much less influenced by damp climates, especially the tropics, although the pyroxylin plastic should be one that is rather stiff at a fairly high temperature, as in hot climates a certain amount of stretching might take place.

No doubt the manufacturers of the plastic materials will be able to provide a suitable material. If generally adopted a very large amount of pyroxylin plastics would be consumed.

Some Queer Uses of Pyroxylin

Recently the writer had occasion to go through some early French patents, and came across these two peculiar, to say the least, uses for pyroxylin and pyroxylin plastics. It is doubtful if there are many who were aware that according to French Patent 343086, May 11, 1904, V. Pfersdorff claimed "a wick for candles, twisted or braided, made from artificial silk, especially from waste obtained in spinning such silk."

However, in the next year, another inventor, Alex. Haase, went him one better in his French Patent 353339, April 13, 1905, in using a solution of celluloid in acetone to impregnate the wicks of candles so as to

(*Concluded on page 373*)

Tuning In on Progress

Changes in dials on radio sets affecting the prosperity of resin molders

THE recent Radio Fair, held at the New Madison Square Garden, New York, was a great success. Not only did the public do its share to swell the gate-receipts, but it is reported that considerable business was written as well.

All this materially affects the molder of phenol-resin products, such as dials, knobs, tube-bases, etc. The previous year still showed models in which the dials were very prominent, and a very large volume of business was done in this line.

The latest developments are not so pleasant for the molder. Dials, as we knew them a few years ago, massive and all made of molded products, are passe. The present style of set uses a metal panel, (a few still retain the laminated types), with an opening corresponding to a window. Behind this is generally a pyroxylin plastic engraved dial, the latest development being a small electric light bulb behind the translucent dial to illuminate the subdivisions. The outside knob for turning this remains of molded insulation.

A dial of this type was exhibited, a greatly enlarged replica of a condenser equipped with it being the center of interest at all times. Our illustration shows the genial owner of the "Garden," "Tex" Rickard, tuning in. The small dial he holds in his hand is identical, except for size, with the larger one. The black markings on the white background, and the transparent plate carrying the registering line are plainly in evidence.

The knob was molded in black Bakelite, and represents quite an achievement for the molding of so large an object, when it is remembered that only one was to be made. A special method for producing this without the customary mold was designed.

Despite the loss of the dial business, the phenol-resin molders have something to be thankful for, nevertheless. The geared up type of vernier dial, with the "window" effects, is being offered as a replacement part for old sets, and all this means molded parts. They are selling with gratifying speed.

Coating Metals With Phenol Resins

The protective value of the phenol resins for the prevention of corrosion has caused quite a number of workers to attempt to use fluid forms of these resins for applying metal surfaces, especially iron.

If used in the form of lacquer, and subsequently hardened, the coating, while highly resistant, is very brittle and if the surface is large and liable to some distortion, the material may possibly check and crack.

A somewhat improved method was to apply the phenol resin in conjunction with an acid-resisting filling material such as asbestos, the soft mixture being applied with a trowel or similar device to form a fairly thick coating. When such material was subsequently hardened, it suffered from the defect that it would be very liable to blister.

J. Wirth, in his U.S.P. 1,582,566, describes a method of coating iron articles with asbestos and what he calls "bakelite" (evidently using it in a generic sense) by first applying a thin coating of pure phenol resin in liquid form to the metal article and then applying thin asbestos paper or board. After this the

material is subjected to a first hardening operation, either with or without pressure. The outer side of the asbestos fibre or paper will remain soft and is still capable of taking up or absorbing further amounts of phenol resin.

Accordingly, more of the liquid is applied until the asbestos is just saturated, and then the coated article is given a second baking to harden the resin.

If the surfaces of the article are so uneven that the asbestos paper cannot be applied smoothly, the paper is either moistened with water or with a solvent or a solution of a resin.

It is also suggested that acceleration for speeding up the hardening of the resin can be applied to the solution used to wet the paper. Quite obviously, the inventor points out, other fibrous material besides asbestos such as fabric or cellulose fibres can be used in a similar way.

Artificial Wood from Serum Albumen or Casein

ALTHOUGH serum albumen, dried blood and casein have been used for some time for the making of materials which are relatively hard and nonabsorbent, there is another very large field in which these essentially plastic materials may be used.

At the same time an outlet can be found for the very large amounts of sawdust, which ordinarily is simply waste product. This is in the manufacture of production of artificial wood

Hundreds of formulae for the have been proposed in the past. Some of them are nothing more or less than actual wood veneer secured together, usually crossgrain, to provide a stronger and less warping artificial lumber. Then means for agglomerating sawdust by various, usually inorganic, cements have been proposed. Most of these are either so hard that they dull the saws, or make nailing very difficult, or are cold to the touch, and more nearly resemble stone than they do wood.

Rudolf Freudenberg, of Vienna, Austria, in his recent U.S. P. 1,587,827, June 8, 1926, proposes to make use of such albuminous materials as blood serum, casein and similar products, with sawdust or wood flour, and to make his artificial wood under hydraulic pressure—a sort of molding operation.

Sawdust

The exertions for making solid masses of sawdust have led to a large number of inventions, that mostly consist in mixing the sawdust with mineral substances such as Portland or magnesia cement, plaster of Paris, caustic lime and water-glass, or with water-glass alone and molding the mixture into various shapes. It has also been proposed to substitute these mineral agglutinants by organic substances like for example resinous substances or asphalt, and instead of sawdust sometimes peat has been introduced into the mixtures of the aobve nature. None of these compositions gives a really practicable substitute for natural wood, because they do not satisfy the requirement of being workable like wood, especially to be likewise apt for nailing, cutting and gluing.

The compositions containing mineral cements are of a stone like nature, whereas those prepared with asphalt are not fit for gluing.

According to the present invention the particles of sawdust and the like are cemented one to another by a special binding medium under pressure. The

(*Continued on page 369*)

Portland Cement Buttons

BUTTONS have been made out of ivory nut for a good many years, but attempts to use cheaper material, and one capable of being molded has led to the patenting of a great many different compositions.

It may interest our readers to learn that even Portland cement can be used for this purpose, as witness a recent United States Patent granted June 1, 1926, to Paul Anft, of Bremen, Germany. (U. S. P. 1,586,731, application filed Feb. 21, 1924; and in Germany Nov. 6, 1922).

The new manufacturing method consists in mixing together at the dry state Portland cement, calcite and coloring substance, in moistening the mixture with a solution of sodium chloride or soap and in pressing the moist mass into molds. Prior to the moistening a powder is preferably added which has been prepared from a hardened mass of Portland cement, infusorial earth (infusorial silica) and milk of lime.

One part by volume of Portland cement and one part by volume of infusorial earth are preferably intimately mixed, stirred with milk of lime up to syrup-like consistency and spread out for drying. After this mass has thoroughly bound it is crushed in mills until a fine powder-like flour is obtained. One part by volume of this mass is well mixed at dry state with one part of Portland cement, one part by volume of calcite (finely ground shell lime) and the required coloring substance.

Pressing

This mixture is moistened with the aid of water in which per liter 20 grams of sodium chloride are dissolved, filled in moulds and pressed. The moulded body can be removed from the mold directly after the pressing and after having well hardened it can be polished in

(*Continued on page 373*)

Cellulose Esters Plated from Solutions

Following the technology developed in the rubber industry, emulsions of cellulose lacquers are used

A few years ago, processes for plating such non-metallic substances as rubber out of solutions, or, more correctly speaking, from emulsions, were introduced. The results were very gratifying and the commercial development of the process followed. The same thing is now being done with the cellulose compounds.

Further patents on this subject will be found in the abstract section on page 366.

PROCESSES for plating rubber upon the surface of either conducting or non-conducting objects have recently been perfected and the commercial utilization of the method is just beginning.

In this connection it is very interesting to read what has been done along the same lines in the cellulose esters, especially cellulose nitrate or pyroxylin. Solutions of this ester in solvents difficulty soluble in water, but capable of forming an emulsion are used according to a patented method of Leon W. Eberlib, U. S. P. 1,589,328, who assigned the process to the Eastman Kodak Co. The patent was granted June 15, 1926.

In an emulsion such as described by the patentee, the dispersed droplets of pyroxylin solution act just as though they were negatively charged, and when an electric current is applied to the emulsion, the droplets will travel to the anode, and coalesce there, forming a coating of pyroxylin. In this respect the action is quite similar to electro-plating with metals, except that the pyroxylin goes to the anode, instead of the cathode as metals do.

In the preferred embodiment of the invention the pyroxylin is dissolved in a liquid which includes a coalescing agent, and the solution then emulsified in an aqueous bath containing a cuitable emulgent and also preferaably containing a protective colloid. For example, dissolve 500 parts of cellulose nitrate, say the kind used for films or the kind used for low viscosity lacquers, in 1500 parts by weight of amyl acetate. Next mix 10 parts of the protective colloid, say gum arabic, for instance, and 150 parts by weight of an emulgent, say 150 parts of Turkey red oil, into 10,000 parts of water. The solution of nitrate in amyl acetate is then mixed into the aqueous bath containing the emulgent and colloid. The mixing is effected by thorough stirring or other suitable agitating process.

Homogenizing

These operations give a preliminary emulsion which is useful by itself for electrodeposition. It is desirable to make the droplets of the emulsion of a more nearly uniform size. This enables the electrodeposition to be conducted better and give a more stable emulsion. The preliminary emulsion is then homogenized by running it through a high-speed colloid mill. The action of the mill is regulated to bring the droplets down to a small size, most of them having about the same order of magnitude. The emulsion is more stable if it is slightly alkaline.

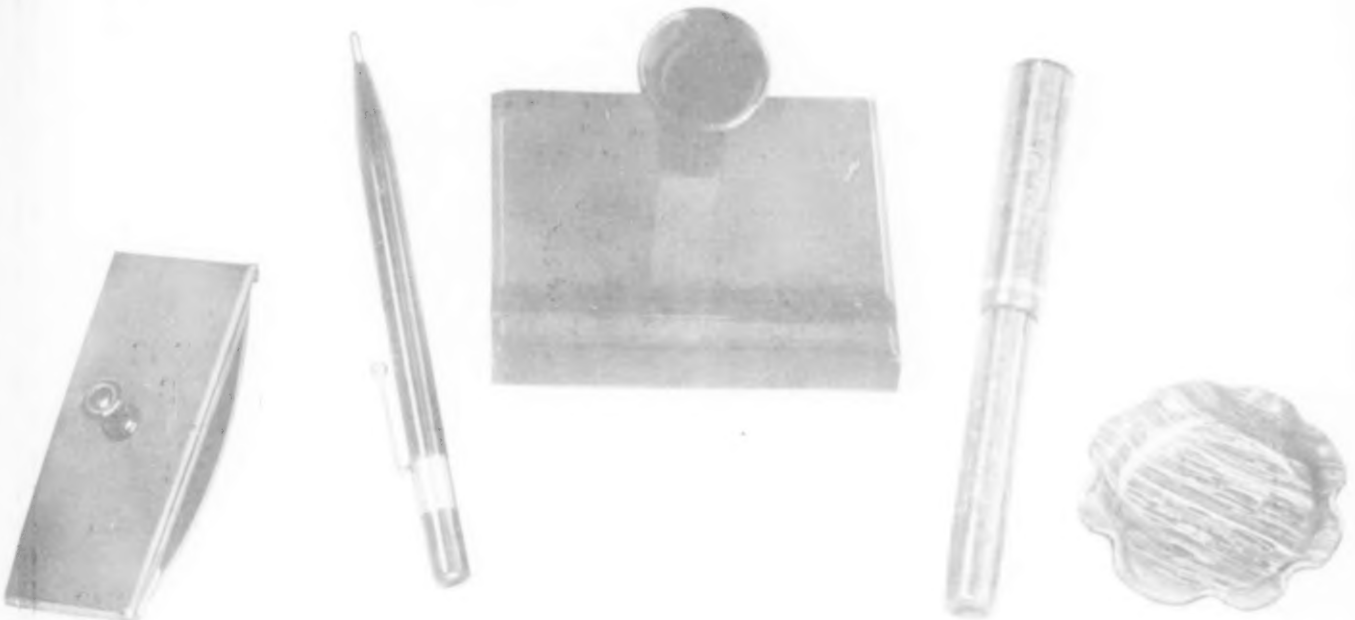
In place of the cellulose nitrate solution, when preparing the above emulsion, a solution of cellulose acetate, for example 500 parts of chloroform-soluble cellulose acetate dissolved in 1500 parts of chloroform or acetylene tetrachloride can be used.

One or more pigments, like lampblack, for example, may be introduced into the emulsion, either by wetting it and mixing it with the completed emulsion or preferably mixing it into the initial solution of the cellulosic compound. Likewise agents which improve the qualities of the coating may be introduced into the emulsion, say by addition to the initial solution of cellulosic compound. Thus camphor, monochlornaphthalene, triphenyl phosphate, trieresyl phosphate, and the like may be introduced into the solution in amounts which bear to the nitrocellulose the customary ratio which they bear in lacquer or film compositions. Substances of this type which increase the flexibility of the coating are customarily referred to as softeners. Preferably the coalescing agent is a common solvent of both the cellulosic compound and the softener.

The droplets in the emulsion act as if they were negatively charged. They, therefore, travel toward the anode.

When the surface has a coating of the desired thickness, it may be removed from the bath and washed with water. In the preferred form of the invention the coalescing agent in the deposited particles has caused them to blend into a coating during the plating. The coating is allowed to set or harden, say by evaporation of some of the coalescing agent from it. This setting action can be accelerated by heating. In fact the coating can be treated in any way in which coatings of cellulosic compounds are usually treated. In

(*Continued on page 371*)



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EDITORIAL · IMPRESSIONS

Is There Really Something New?

NOW that our readers know the outcome of the Contest, the above question is perfectly proper.

Yes, there is.

However, it is sometimes very very difficult to recognize a new idea, and only too often it is born years and even decades before its time, so that when the real development comes it has perhaps already been forgotten.

Take Pyroxylin for example. It surely was brand new when Schoenbein discovered the substance and when Hyatt first gave it its most popular name—Celluloid. But that was back in the fifty's and sixties of the past century.

The phenol resins—as Bakelite — were new twenty-five years ago; but who was there except perhaps the inventor who could visualize the perfectly tremendous development?

Similar inventions are being made today. Take Furfural for example. Only a few years ago it was purely a laboratory curiosity — expensive, hard to make; apparently useless. But along came the Chemist, and made it cheap and plentiful. Even so erudite a personality as Dr. Frank Crane, of editorial fame, has condescended to notice it now in the daily press. He wrote an editorial on it a few days ago that was syndicated throughout the country by the McClure Newspaper Syndicate. He says "Keep your eye on furfural. It is a liquid of which we do not yet know all of the possibilities. * * * In the meantime it will pay you to keep your eye on furfural, for there is no telling to what purpose it may be applied."

Why?

IT may have struck you as rather strange that, when contemplating the impressive statistics of the Plastic Industry, accurate information as to the latest developments in this field have been mighty few. The technical side, at least as far as the chemistry of it was concerned, has been covered at least in part by such papers as Chemical and Metallurgical Engineering; Journal of Industrial and Engineering Chemistry and the British publication, the Journal of the Society of Chemical Industry. In every abbreviated form, Chemical Abstracts has also kept abreast of the times.

However, the general industry dealing with plastics fabrication has not been covered, and only a few of the very largest producers have been subscribers, or at least through their chemists, to the above papers on the subject.

Here is where PLASTICS fits in. You may have noticed that it is quite different from the usual run of what is called a "trade" paper. There is a good reason for this.

The Trade Paper

The average "trade paper" deals very much with personalities; has countless items about Mr. So-and-So and this firm or that. Of course all this is interesting—for the moment; but the real important thing in an industry is the technical development. In the main part this development is reflected in the patents taken out by the various concerns in the field. Nothing stimulates inventiveness as much as competition in the development of really new ideas.

It is an indisputable fact that every really new patented idea immediately brought in its train scores of patents for improvements and perfections; so that every basic patent opens up an entirely new art. That is the main reason why we are giving so much space to patent descriptions. At times they may seem rather dry, but remember, back of each of them is a living and thinking Worker, who is putting his shoulder to the wheel to advance the industry along the Highway of Progress.

The Sesqui

PHILADELPHIA, the cradle of American liberty, is doing herself proud these days. Located at the foot of Broad Street, and adjacent to the League Island Navy Yard is the Sesquicentennial International Exposition, to commemorate the 150th anniversary of the signing of the Declaration of Independence, and also to show the World what Philadelphia can do in the line of expositions.

The results, now that the affair is really under way, are highly pleasing, and well worth a visit from every manufacturer. The fabricator of pyroxylin plastics will be particularly interested in the remarkable display of Japanese pyroxylin plastic goods, in building No. 1. They show a workmanship and finish that is every bit as good as the domestic article. It is quite evident that contacts with importers are being made. Due to the difference in the labor market, our trans-pacific friends are able to underbid the local producers, despite the protection supposed to be afforded by the tariff.

Other plastic materials are also represented; the manifold ramifications of the phenol resin industry being apparent on every side—from electrical apparatus and radio to intrument boards for airplanes.

New Molding Compound Contains Acetone-Furfural Resin

THE number of useable synthetic resins is being augmented continually. As commercial furfural is now practically assured, and as it is understood that its manufacture from such waste products as oatmeal hulls and corn cobs assures a steady supply, any resins involving the use of this compound become of increasing interest to all molders and artificers of thermoplastic materials.

The Cutler-Hammer Manufacturing Co., through its assignee, Linwood T. Richardson, both of Milwaukee, Wis., has recently patented further applications of the furfural resins, this time the products obtained by condensing furfural, acetone and naphthalene sulfonic acids, alkalies being used as the catalytic agents.

To produce the reaction product according to this invention (U. S. P. 1,584,144, May 11, 1926; appl. Aug. 10, 1925) from 96 to 288 parts of furfural are employed to 58 parts of acetone and from 25 to 50 parts of a 15 per cent. sodium hydroxide solution. In one method of procedure, 25 parts of the sodium hydroxide solution are placed in a suitable container and the mixture of furfural and acetone slowly added. The reaction is said to be quite rapid and much heat is evolved. The best way of controlling the action is to gradually add the ingredients, or to resort to external cooling; the preferred temperature at which to work being given as from 140 to 160°F.

Complete Product

The reaction product is alkaline and is neutralized or better still slightly acidulated with phosphoric acid. The product is then washed with water and dried until completely dehydrate at 210 to 220°F. The final product is in the form of crystals mixed with a thick liquid.

This initial condensation product of furfural and acetone, is then dissolved or mixed with a suitable condensing agent, commercial naphthalene sulfonic acid being especially adapted for this purpose. The fillers should not be alkaline in nature or reaction and hence acid-washed asbestos, cotton flock, wood flour or similar filler should be used. The final condensation is brought about in the mold, by heat and pressure.

A binder for mixing with the filler material is made by dissolving, by slight heating, 9 parts of the dehydrated furfural acetone product with 1 part of naphthalene sulfonic acid; and a suitable mix for hot molding consists of 10 parts of this binder with 10 parts of acid-washed cotton flock.

The material is hot molded under suitable pressure at about 350°F, under which conditions the material react further; a three-minute cure being sufficient for small articles. After ejection from the mold, no further treatment is necessary.

It will be seen from the above that there are no great technical difficulties involved, and the product should prove useful. The ingredients are all fairly inexpensive, and are likely to become even more so. The product is entirely free from phenol, and represents a different type of resin from the ordinary types exemplified by Bakelite.

As new methods for the cheaper production of acetone and furfural are developed these resins will become of increasing importance.

Utilizing Pyroxylin Film Scrap

Diluted spent nitrating acid used

ANOTHER process for reducing the viscosity characteristics of pyroxylin scrap has been patented by the Eastman Kodak Co., patent 1,588,098, June 8, 1926, being assigned to them by Leonard E. Branchen.

It will be recalled that similar processes have already been patented and noticed in **Plastics** in the May issue of the present year, page 158.

The present process concerns itself with the treating of pyroxylin or film scrap or waste. This is first chopped into small pieces and then placed in a bath of methanol (wood alcohol or methyl alcohol) diluted down to 5 per cent. strength with water. The scrap is allowed to remain in this solution for from 1 to 5 hours, a slight heating, say to about 40 degrees C hastening the process. This softens the pyroxylin, while it does not actually dissolve it, but make it amenable to the treatment which follows.

While still in this softened condition, the pyroxylin is brought into contact with an acid bath which may be conveniently prepared from the spent acids from the nitration of the cellulose from which pyroxylin is made. A 30 per cent. solution of this spent acid, which will give the solution a composition of about 20 per cent. sulfuric acid and 10 per cent. nitric acid and from 1 to 2 per cent. of nitrous oxides, is quite suitable. The treatment takes place at room temperature and tests taking at various intervals to determine the viscosity are made. When adjudged to be correct, the material is taken out of the acid bath and washed with warm water. Due to its loose physical structure the washing rapidly removes the acids, and the product has satisfactory stability when subjected to the usual tests.

In conjunction with the process for making a rubber and pyroxylin combination lacquer, the process appears to have possibilities.

Photography With Synthetic Resins

(*Continued from page 346*)

in about five minutes. In contrast to this, furfural and aniline condense only slowly without the aid of light, even when boiled together.

As another modification, the following is given:

(d) Indirect photo condensation.

The addition of small quantities of iodine in a mixture of furfural and aniline in the dark produces a viscous condensation product of a deep red color. To produce prints rapidly by means of this reaction, a mixture of furfural and aniline is sentitized by adding a small amount of iodoform, or any compound which will liberate iodine when it is exposed to light. With such a medium, accelerated reaction progresses directly upon the support which is to receive the image. A deep red coloration results under a 30 seconds exposure wherever the light has been permitted to act; and, with continuous tone negatives, the depth of color is proportional to the intensity of the light, producing a highly visible image. If desired as an etching resist on a metallic or other surface, this medium used alone or combined with another, such as cellulose acetate, may be developed by suitable solvents, like alcohol, benzol (benzene), etc.

Pyrrol product.

(e) Resinous pyrrol condensation products.

We have distilled pyrrol to purify it, and have found that the sticky resinous residue is sensitive to light, producing a print in eight minutes. After sensitization with iodoform, a print was produced in six minutes. As an alternative to this, ten grams of purified pyrrol were added to seven grams of concentrated sulphuric acid, when another resinous substance was produced. After being dried, dissolved in benzene, and applied as a film, it was found to be so light sen-

sitive as to produce a print in two minutes.

The foregoing examples are given merely as illustrative of the invention or discovery. The invention is adaptable to a wide variety of industrial uses. Coatings, or films, produced from these media are especially resistant to the action of acids, as for etching in relief or intaglio, but more permanent in this respect than asphaltum; and the sensitivity of the media is also greater than that of asphaltum.

While it is preferred to employ solutions of the synthetic resins and apply such solutions as thin coatings to suitable surfaces, the invention is not to be understood as limited to such method of use.

Dyestuff as Sensitizers

Patent 1,587,270, of the same date, June 1, 1926, says that besides the inorganic sensitizers, dyestuffs have been found useful.

"As sensitizers, we have found magenta, or rhodamine, alone or in combination with iodine to give excellent results. Iodoform is also a good sensitizer. In addition, the metal alkyls, such as lead tetra ethyl, combined with a slight excess of iodine (perhaps forming tri ethyl iodine) also have been found to act very well as sensitizers, producing images within three minutes which are rapidly developed by simply immersing them in solvents, such as alcohol and water."

With Bitumens

An extension of the method found serviceable with the furfural resins to the natural bitumens, but with the aid of sensitizers, is the subject of the next patent, 1,587,271.

This sensitizer may consist, for asphatum, of

	Per cent.
Ethyl methyl ketone	22
Iodoform	12
Solvent naphtha	65½
Concentrated ammonium hydroxide	½

and the photographic medium or coating which we use consists of:

	Per cent.
Asphaltum	10
Solvent naphtha	40
Benzine	25
Sensitizer	25

Such a coating is flowed or otherwise applied to a grained or any desired smooth surface, allowed to drain and dry. The coated surface is then exposed to a luminous image by contact or by optical projection for from one-half minute to four minutes according to the character of the image. After the exposure the print is developed with

	Per cent.
Oleic acid	50
White mineral oil	50

by applying the same in a gentle manner and rubbing softly with any suitable medium. When completely developed the print is rinsed with dilute ammonia and then with water.

Patent 1587272 goes into further details. The inventors proceed to state that:

A synthetic resin, associated with a sensitizing agent, or with such sensitizing agent omitted, depending upon the degree of natural sensitiveness of the resin, or depending upon the particular results desired, may, in accordance with the present invention, be subjected to the selective action of light in accordance with an image, design or character, and thus there may be produced in the sensitive body, or film, a transformation, resulting in an image, design or character in such body, or film; and the film, or image, may then be developed in any suitable manner.

In general, it is preferred to employ a solution of a synthetic resin, capable of producing a film, or coating, on a suitable support or surface; and with many of the different kinds of resins, it is advisable to employ special sensitizers, and preferably a sensitizer which comprises a halogen source, or a halogen-liberating compound.

* * *

It may be added that extended researches have been made by us with various classes of organ-

ic compounds, which, when mixed together at room temperature, or slightly above, have condensed to form viscous polymerization products. Such condensations may be accelerated by the presence of various ingredients, such as iodine, or other halogen. We have found that compounds of a halogen, such an iodoform, or the metal alkyl halides, liberate halogen under the action of light. Such sensitizers may be used advantageously in connection with most of the synthetic resins to continue by photo polymerization, halogenation, or catalytic action, the selective condensation.

The following examples may be given by way of illustration:

Mix 15 grams of phenol, 15 grams 40 per cent. formaldehyde solution and 1 gram iodine; allow the same to stand at room temperature about forty-eight hours. This results in a resinous condensation product. Ten grams of this resin dissolved in 55 cc. of butyl acetate with 3 grams of iodoform added, produces a sensitive coating, which gives a print in about three minutes. This is developable, for example, in 75 per cent. alcohol.

Other Examples

Five other examples are given, including condensation products of aniline, benzl aniline and the like.

Reference has already been made to phenolic condensation products. As is well known, such condensation products can be formed by condensing the phenols with active methylene bodies, such as formaldehyde, hexamethylenetetramine, or other active methylene body. Resins thus produced can be readily sensitized by means of a small percentage of iodoform, as in the example of the phenolic condensation product given above. Other sensitizing agents may be employed.

It is pointed out that some of the furfural resins particularly are very sensitive to light, and may be usefully employed without associating therewith any

special sensitizer. In some of the resins of the type just referred to, however, it is advisable to employ special sensitizers, such as sensitizers comprising a halogen source, or a halogen-liberating compound.

The ramifications of this method of photography are gone into still further in the last two patents, 1,587,273 and 1,587,274.

It is undoubtedly true that an important subject has been opened up by these researches, and further developments are awaited with much interest.

Molding Hollow Objects

(*Continued from page 348*)

perimposed upon the core 5 and the weight of the mold sections upon this core will cause the material 13 to be pressed into intimate contact with the entire face of the mold sections and will also cause some of the material to be extruded into the voids 10 between the flanges 9 on the core, as indicated at 14. This extruded material provides offsets or projections on the material of the casting. Heat is then applied to the core 5 to slightly harden the material 13, but not to the degree necessary for the finished casting. The core 5 is then removed by lifting off either one or both of the mold sections 1 and 3 and a core designated 15 substituted. This core is hollow, the same as the core 55, but is of a different shape, as will be apparent from an inspection of Fig. 4, the neck and shoulder portions of the doll only to be retained, the portion employed with the core 5 for conforming the material to the back of the head and face of the doll being straight, for example, in this core, as is also apparent from Fig. 4. This core is of such a thickness as to permit the mold sections 1 and 3 when superimposed thereon to meet at their edges, as we have indicated at 16. This core may be heated by applying a gas pipe to the orfice 17 therein or may be heated in any other suitable manner. The

mold sections 1 and 3 containing the partially finished casting are superimposed upon the core 15, and inasmuch as the mold sections may now move toward each other until they touch, as above indicated, the offsets 14 will now move or be moved into engagement with each other and pressed into each other, so to speak, to form a union between the offsets. Heat is then applied to the interior of the core 15 and maintained until the material 13 has hardened to the degree desired, after which the mold sections are removed and the core 15 pulled out of the casting, leaving a one-piece casting, the two original sections being united by the offsets 14. The offsets may be of any length desired, that is to say, the flanges 9 on the core 5 may be shortened or lengthened as may be found expedient, and as a matter of fact may be shortened so that the joint between the two sections of the casting is almost continuous throughout the line of divisions provided originally between the two casting sections.

"This method and apparatus provide a very much improved way of manufacturing doll's heads, although, if desired, the same mtehods may be employed for casting other articles."

TECHNICAL ABSTRACTS
AND PATENT REVIEW

Electroplating Organic Materials such as Rubber Cellulose Esters and similar Colloid Bodies

A SERIES of very interesting patents were issued on June 15, 1926, to the Eastman Kodak Co., of Rochester, N. Y., on applications of a number of their research workers.

One of these patents has been discussed in detail on page 354 of the present issue of Plastics. A short resume of the patents follow:

Carl L. Beal and Leon W. Eberlin, U. S. P. 1,589,324.

In the electrodeposition of organic materials on anodes from aqueous emulsions thereof, such as aqueous emulsions of rubber of cellulosic compounds, like nitrocellulose, acetyl cellulose, and cellulose ether, the coatings sometimes become impaired by oxidation from nascent oxygen liberated at the anode when high current densities are employed. Moreover, under these conditions the process is apt to be slowed down by polarization at the anode, due to liberated oxygen. Of course, bubbles of oxygen tend to spoil the continuity and smoothness of the deposit.

The difficulties can be wholly overcome or very largely avoided by having present in the anode zone, during the deposition, a metal which has a greater affinity for nascent oxygen than the deposited organic material has. Examples of suitable metals are zinc, cadmium and magnesium.

Samuel E. Sheppard and Carl L. Beal, U. S. P. 1,589,325.

This invention relates to process of electrodepositing organic material, such as rubber, upon porous objects of non-conducting material, such as fabrics.

The depth and character of the deposit can be controlled by adding a size containing a coagulant to the porous object of non-conducting material, such as the fabric, before the electrodeposition takes place. In general is preferred to use acid hydrophilous colloids which are typified by such substances as glue, starch, dextrin, etc.

Samuel E. Sheppard and Carl L. Beal, U. S. P. 1,589,326.

Inequality and defects can be wholly or largely avoided and a smoothness of texture obtained by first covering the surface on which the electrodeposition is to take place, with a substratum which forms a diffusing path for the current at said surface. The subtratum is preferably an organic one and tends to equalize the effective potential at all the points over said surface. Where the surfaces covered with substratum are to be kept or transported for some time before use. It is preferable to have the substratum hygorscopic.

Suitable materials for the substratum are, for example, gelatin, glue, a mixture of glue and rubber emulsion, artificial rubber emulsions or natural rubber emulsions such as latex.

Leon W. Eberlin and Carl L. Beal, U. S. P. 1,589,327.

This invention relates to the deposition of cellulosic compounds onto conducting surfaces of objects.

The process of depositing a cellulosic compound onto an electroconducting surface of an object, which comprises the steps of bringing said surface into conatct with an aqueous electroconducting emulsion containing an emulsifying agent, droplets of said cellulosic compound and a protective colloid, and passing an effectively unidirectional depositing electric current through said surface and emulsion.

Leon W. Eberlin and Carl L. Beal, U. S. P. 1,589.328.

This patent has been treated fully in the present issue of Plastics. See page 354.

Samuel E. Sheppard and Leon W. Eberlin, U. S. P. 1,589,329.

The invention relates to an improved method of electroplating strip material such as metal wire or ribbon with rubber.

If the freshly coated material, while the coating is but partially dried and is still in an eminently plastic condition, is submitted to a firm, even, pressure without much rubbing or friction, it will be compacted or consolidated into a layer of even density and surface, eliminating any chance local pinholes and slight surface irregularities and resulting, after complete drying and vulcanization in a firm even coating. The rollers are preferably so shaped and spaced that they constitute gauge by which the thickness of the coated wire or ribbon is accurately predetermined.

Samuel E. Sheppard and Leon W. Eberlin, U. S. P. 1,589,330.

This invention relates to aqueous emulsions from which rubber and one or more cellosic compounds are electrodepositable. One object of the invention is to provide an emulsion from which rubber and a cellulosic compound may be quickly and inexpensively electrodeposited simultaneously upon articles having conducting surfaces. The invention is best exemplified by claim 6.

"In the process of preparing an aqueous emulsion of electrodepositable unvulcanized rubber, vulcanizing material, a cellulosic compound, and a coalescing agent therefor, the steps of mixing an aqueous emulsion containing in the disperse phase said cellulosic compound and said coalescing agent, with an aqueous emulsion containing in its disperse phase said unvulcanized rubber and said vulcanizing material, and finally subjecting the mixture to agitation until it is homogenzied."

Samuel E. Sheppard and Leon W. Eberlin, U. S. P. 1,589,331.

This invention relates to aqueous emulsions of unvulcanized rubber and sulphur. One object of the invention is to provide an improved emulsion of this character suitable for electrodeposition by the process disclosed in our U. S. Patent No. 1,476,374, granted Dec. 4, 1923, for electrodeposition of rubber coatings. Another object of the invention is to provide such an emulsion in which the sulphur is held in suspension with especial firmness, so that it may be added in relatively large quantities and yet will enter the electrodeposited coating with the rubber.

To an aqueous rubber emulsion, such as one prepared in accordance with our above cited patent, or a natural one, such as rubber latex, preferably made stable by an alkaline agent, such as ammonia, add an aqueous emulsion of sulphur containing the protective colloid. For example, prepare an aqueous solution of gum arabic or gelatine or glue having a concentration of about ½%. Into this disperse the sulphur, say 20%. This dispersing may be accomplished by any of the means known in this art, such as by precipitation or agitation. One convenient way is to mix the sulphur into the solution in finely divided form, like flowers of sulphur, and then pass the mixture through a high-speed colloid mill of any of the types now on the marke.t

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Samuel E. Sheppard and Leon W. Eberlin, U. S. P. 1,589,332.

This invention relates to the electrodeposition of coatings comprising rubber and one or more cellulosic compounds.

First provide separate aqueous

emulsions of unvulcanized rubber, of vulcanizing material, such as sulfur, and of the cellulosic material. Or may use rubber latex having about 30% of rubber therein, and preferably stabilized by being made alkaline, say with ammonia for instance.

The sulfur emulsion is readily prepared by mixing 20% of comminuted sulfur, say flowers of sulfur, into a 5% solution of glue in water. The mixture is then given intensive agitation, say in one of the high-speed colloid mills now on the market.

Then prepare the emuslion of one or more cellulosic compounds. For example, 50 parts of cellulose nitrate are dissolved in 150 parts of amyl acetate. One part of a protective colloid, such as glue or gum arabic is mixed, along with 15 parts of an emulgent like Turkey red oil, in 1000 parts of water. The solution of cellulose nitrate in amyl acetate is then thoroughly mixed into the aqueous bath. Finally the mixture is homogenized by intensive agitation, as in any of the well known colloid mills.

The above described emulsions of unvulcanized rubber, sulfur, and cellulosic compound, are then mixed together and the mixture finally homogenized by running it through a suitable mill. A low-speed disc grinding paint mill is satisfactory.

The mixed emulsion thus produced can be effectively used for electrodeposition and subsequent vulcanization in the way described in the above cited patent.

Zyl-covered Separable End-pieces in Eyeglass Construction. E. L. Schumacher, assignor to American Optical Co., Southbridge, Mass. U. S. P. 1,577,197; Mar. 16, 1926.

Purpose is to provide individual coverings of pyroxylin plastic material (called Zyl) for the separable elements of the end-piece, so that repair to the lens or other elements can be more readily effected.

Amber or Ivory-like Phenol Resins. Carl Kulas and Curt Pauling, Leipzig, Germany. U. S. P. 1,582,056; Apr. 27, 1926.

Infusible and insolube phenol resins, but of such texture that they can be machined as readily as amber, ivory and the like are produced by the condensation of phenol and formaldehyde in the presence of an acid catalvst, as hydrochloric acid or oxalic acid; followed by addition of further amount of phenol and formaldehyde with the addition of sufficient sodium carbonate or potassium hydroxide to insure a slight alkaline reaction. To insure greater pliability and transparency there are added also amyl alcohol, camphor oil and glycerol.

The inventors call their process a "two-phase process" and claim the "process for making resinous products * * * * and then adding a liquid capable of increasing the elasticity of the mass, namely amyl alcohol plus glycerol, boiling the mass until the water is driven out and finally hardening it by heating at atmospheric pressure."

(*Abstracts continued on p. 368*)

Technical Abstracts

Hardening Glyptal resins (glycerol-phthalic acid products.) James G. E. Wright, assignor to General Electric Co. U. S. P. 1,581,902; Apr. 20, 1926.

The hardening of the phthalic acid—glycerol resins typified by Glyptal can be hardened more rapidly by adding to the resin certain substances which act as dehydration catalysts, for example, calcium oxide, magnesium oxide, zinc oxide or certain metals in the finely divided state, as iron-by-hydrogen, or zinc.

A typical moldable cement consists of 73 parts of marble dust, 16 parts of glyptal and 1 part of the catalyst, in this case iron reduced by hydrogen. As a solvent for the resin, acetone; or a mixture of acetone and alcohol can be used. This resin will harden in 1 or 2 minutes at 240°C.

In cases where the final product is part of an insulating material, the oxides are preferred.

Laminated Mica Product Made with Glyptal Resins. L. E. Barringer and Chas. F. Peterson, assignors to General Electric Co., U. S. P. 1,589,094; June 15, 1926.

Mica flakes are superimposed upon each other and united by a hardenable resin made from glycerol and phthalic anhydride and the product is heated until the resin sets sufficiently to permit the object to be shaped and worked; the final hardening the infusible stage being performed later.

The resins used are those described in the Callahan patents 1,108,329 and 1,109,330, now generally known as "glyptal". The electric insulating properties are stated to be superior to shellac and the product is more heat-resistant than the ordinary phenol resins.

(The product and the resin were exhibited by the General Electric Co. at last year's radio show the resin being a brownish red transparent material. Ed.)

DYEING CELLULOSE ESTERS AND ETHERS. C. Muller, assign to Grasselli Dyestuff Corp., New York, U. S. P. 1,587,669, June 8, 1926.

The cellulose esters and ethers can be dyed directly with the monosulfonic acids of 1-aminoanthraquinones having the hydrogen groups of the amino radicle replaced by alkyaryl or aralykyl groups, or not; and a substituting group in the 4 positions relative to the 1-amino, this substituting group being either amino, hydroxy, alkyl, aryl or aralkyl-amino or aralkyl-hydroxy group. The sulfo group is in the same nucleus as the amino group.

GOLF CLUB HEAD CONTAINING PHENOLIC RESIN. N. A. Rose, U. S. P. 1,588,617, June 15, 1926.

A golf-club head comprising wood of the genus Nyssa impregnated with a phenolic resin.

Artificial Wood

(*Continued from page 353*)

binding material used consists of a solution of an albuminous substance, caustic lime and a silicate of an alkali. Serum albumen, as it is prepared from blood and consists in filling fresh blood in trays where it is allowed to stand till its separation in fibrine and serum albumen is completed, is used. Then the serum albumen which remains in a liquid state is drained off from the fibrine in any appropriate manner. As a silicate of alkali sodium silicate commonly known as water-glass, is especially suitable.

Examples

For instance about 450 kg. of sawdust are mixed with a binding or cementing medium consisting of 12-29 kg. of serum albumen from blood, 3-6 kg. of caustic lime, 3-6 kg. of water-glass and 30-40 kg. of water. If wood chips are to be used instead of sawdust, a lesser quantity of water will do. After thorough mixing the mass is subjected to a pressure of about 150 atmospheres at a temperature of about 100° centigrade and is then allowed to dry, which takes but a short time. There results a dense and solid body, forming a substitute for wood which in many respects is superior to the natural product. The pressure the mass is exposed to must be varied according to the purpose the final product is destined for. Pressures of 100-200 atmospheres have been proved to give good results.

In case casein is employed as an albuminous substance it is advantageous to modify the above given proportions and to take 450 kg. of sawdust, 20-30 kg. of commercial casein, 7-10 kg. of caustic lime, 4-6 kg. of water. In using condensed milk the proportion of this ingredient must be regulated in taking in consideration the degree of condensing the milk has undergone. Satisfactory results with com-

mercial condensed milk are obtained by taking 450 kg. of sawdust, 100-120 kg. of condensed milk, 8-12 kg. of caustic lime, 8-10 kg. of water-glass and 80 kg. of water. If is is preferred to use curds, take 450 kg. of sawdust, 40-50 kg. of curds, 7-10 kg. of caustic lime, 4-6 kg. of water-glass and about 100 kg. of water.

When fibrous material such as peat or the like is entered into the process the proportion of sawdust or wood chippings is diminished in accordance with the weight of fibrous material added.

One of the effects of the water-glass in the mass is that it makes the product waterproof. It is necessary to expose the mixture to strong pressure at high temperature in finishing stage of the process, because if these measures are not attended to, there cannot result products fit for being worked upon like wood and for being glued in an efficient manner.

The invention is not confined to the use of sawdust, wood chippings or peat. In some cases vegetable fibres may be added to the mass before pressing. The wood substitute produced can be planed, cut, nailed and especially can be veneered in the same way as natural wood.

Manufacturers of wood flour, as well as producers of casein may find the above method stimulating in working out new means of disposing of these two important materials. By making the molds with designs instead of perfectly flat, carved effects might be produced, and the product otherwise provided with an artistic finish.

New data on
both dried blood and
casein PLASTICS
will appear in our
NEXT ISSUE.

Plating Cellulose Esters

(*Continued from page 354*)

case the deposited particles of cellulosic compound are not properly blended by the amount of coalescing agent which is present they can be brought together by special treatment, say by mild mechanic action with a brush or by bathing in a bath containing a suitable coalescing agent, or by both.

The amount of emulsifying agent that remains in the deposit does not in general impair it, the final coating being for ordinary purposes as useful as those prepared in other ways. Where the minimum amount of mineral matter is desired in the deposit, for instance, when its electrical resistance is to be emphasized, the emulsifying agent may be in the form of an ammonium soap. The ammonia can be split off and driven away by heating.

Just Like Electroplating

In an emulsion such as described by the patentee, the dispersed droplets of pyroxyln solution act just as though they were negatively charged, and when an electric current is applied to the emulsion, the droplets will travel to the anode, and coalesce there, forming a coating of pyroxylin. In this respect the action is quite similar to electro-plating with metals, except that the pyroxylin goes to the anode, instead of to the cathode as metals do.

This method undoubtely saves considerable solvent, and its possible extension to the manufacture of coated articles, waterproof fabrics and the like is indicated. Despite all of tremendous amount of work that has been done in the past in the field of the cellulose esters, it almost seems as though we were just at the beginning of the art, and hardly a day passes but some new and possibly far-reaching discovery or invention becomes known.

Ideas !

(*Continued from page 349*)

ials. Patents are being taken out daily. We won't bar any one just because he patented the idea, as witness one of the winners. So come you all—send them along and if they have any merit at all they will be duly considered.

Joins Sales Force

General Plastics, Inc., makers of Durez molding compounds, have added to their sales force Mr. Thomas A. Ryan and Mr. Herbert S. Spencer.

Mr. Ryan has previously been associated with one of the plastic molders and his service in the field will be very helpful in a sales service capacity.

Mr. Spencer has had a broad experience in sales promotion work and comes to them from the Rand-Kardex organization. He will have charge of advertising.

Recent Trade Mark Applications

Ser. No. 201002. Lefax, Philadelphia. Application filed Aug. 5, 1924; use since Nov. 1914.

"Lefax," on celluloid leaves. (also other material not pertinent to Plastics).

Ser. No. 222680. Geo. H. Irvine, Filed Nov. 2, 1925, use claimed since Apr. 15, 1925.

"E. Z. Glo." Polishes for cellulose lacquer surfaces.

Ser. No. 231952. James B. Sipe & Co. Filed May 20, 1926; use claimed since March 23, 1926.

"Butalac." Ready-mixed lacquer.

Ser. 231950. James B. Sipe & Co. Filed May 20, 1926; use claimed since march 23, 1926.

"Sipolac." Ready-mixed lacquer.

Ser. No. 228317. Jones-Dabney Co., Inc. Louisville, Ky. Filed Mar. 8, 1926; use Feb. 1, 1926.

"Peacock Lacquer." A nitrocellulose lacquer.

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TO PURCHASE—Early issues of PLASTICS, especially the Dec., 1925, Feb., May and June numbers. Will pay 50 cents cash for any number in good condition earlier than July, 1926. Address PLASTICS, 461 4th Ave., New York City.

Accessories
For Toilet Articles

Portland Cement Buttons

(*Continued from page 253*)

polishing drums or polishing disks.

The method may be varied in the following manner: Two parts by volume of Portland cement, one part by volume of calcite and the determined coloring substance are well mixed together at dry state. This dry mass is stirred with a soap solution at 7%, pressed and subsequently treated as stated above. After the hardening, but prior to the polishing, the moulded bodies have to be saturated with an alum solution of 5%.

Although the holes for the buttons may be drilled by means of drilling machines they might be stamped out at the pressing.

Instead of calcite finely ground arenaceous quartz, soapstone, marble powder and the like may be used.

The solidity of the buttons produced according to the new method is at least equal to that of the buttons made from ivory-nut.

While useful for buttons, it appears that this process may be very applicable to other small objects.

The Fabricators Meeting

(*Continued from page 350*)

industry—the lowering of quality and the consequent loss of consumers' confidence. Mr. Pitcher, Mr. Marder and Mr. Marx all emphatically advised the use of finer materials if the toiletware business was to hold its prestige.

The quality of the bristles used in the making of pyroxylin plastics brushes came in for considerable "panning" by those present. It is a well known fact that very rarely are pyroxylin plastics brushes for ulitarian purposes. Because of the poor quality of the bristles, the public has come to rely upon the wooden backed brush in preference to the more decorative pyroxylin one. There was some talk about a general agreement among the fabricators to use a better, or, as Mr. Pitcher phrased it, a "decent grade of bristles." No definite understanding was reached although every one present agreed that it would be an excellent thing for the industry if a finer quality of article were offered to the public.

The future meeting of the Executive Committee of the Pyroxylin Fabricators Association and the Toiletware Division will be held on the first Monday of each month at 3 P. M., at 200 Fifth Avenue, New York, N. Y.

Queer Uses of Pyroxylin

(*Continued from page 351*)

leave a thin film of celluloid on the wick, to increase its inflammability and to make it easier to light the candle.

In view of the recent contest, this will give one a fair idea of how versatile the workers in this field have been. Anyway, it sheds some light on the subject.

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